24 Nov 72
(DATE)

MEMORANDUM FOR THE RECORD - Opinion Request (Fast/~~Telephone~~)

SUBJECT: OST Proposal (new) "Special Topics in Physics"

SES desires our comments ASAP, of course. I would prefer a full opinion which would take longer rather than a quick and superficial one. Let's try to aim for 4 Dec. If you are unable to meet that date, let me know. Please phone comments over first and then follow up, if necessary, with hard copy. Thanks.

Attached is self-explanatory information from the Department of State. May we have your opinion by ~~see above~~.

Please state, in answering, your degree of interest and whether requirements will be levied.

25X1A

[redacted] memo 10 Nov 72 25X1A [redacted]
(IIAGE)

COMMENT: see attached

1 OSD: - see attached

1 OER: - no interest - defer OSI-NED

6 AF:

STATE TOLD JKW

DATE Dec 72

BY NEAB

1 NAVY:

2 ARMY: favors as long as theoretical esp 2 theoret topics

1 DIA:

GSD:

IRS: (Ellie)

15

FTD & OSR - no obj & interest

See = no obj providing Sov Grp composed of reps of Institutes of Higher Learning & no specialized research facilities are involved

OST Proposal (new) "Special Topics in Physics"

CLASSIFIED BY: 01-0332
EX-2 APDIR
EX-SIM

CONFIDENTIAL

15 Nov 72 AM
(DATE)

MEMORANDUM FOR THE RECORD - Opinion Request (~~Visit~~/Telephone)

SUBJECT: New OST Proposals

Forestry (not necessary to check at moment)
Special Topics in Physics, theoretical and experimental
Theoretical incl Realivistic astrophysics
25X1A Many-Body Theory } little significance

[redacted]

Experimental incl
Gravitation radiation — small Sov gain
Atomic Physics — larger Sov gain
Heavy Ion Physics — about equal
(IIAGE)

NSF to be US coordinator or some if not all.

25X1A

[redacted]

STATE TOLD ~~16 Nov 72~~ JKW
DATE 16 Nov 72
BY NEAB

OST

CLASSIFIED BY: 01-0332
EX-2 APDTR
DI-SISM

CONFIDENTIAL

11/22/72

No time
Opinion requested
ASAP!
PKW

MEMORANDUM

DATE: November 10, 1972

To : Dr. Norman Neureiter
Office of Science and Technology

From : Head, Physics Section
National Science Foundation

Subject: U.S.-U.S.S.R. Collaboration in Physics

OPINION
24 Nov 72

Here is the information on proposed special topics in physics for U.S.-U.S.S.R. collaboration, as recently discussed with you.

Marcel Bardon

Attachment

Copy to:
Dr. Bodo Bartocha
Office of International Programs

Dr. E. P. Todd
Deputy Assistant Director for Research

Dr. William E. Wright
Division Director, Mathematical
and Physical Sciences

US-USSR Collaboration: Special Topics in Physics

A. Theoretical Physics

It is proposed to set up a mutually acceptable framework within the terms of the US-USSR agreement which will facilitate the close interaction between theoretical physicists in the two countries who are working on problems of mutual interest in selected areas of physics.

The objective of this project is to promote a coordinated attack on a number of critical and outstanding problems by investigators in both countries who are generally accepted as the world leaders, particularly in the areas of relativistic astrophysics and many-body theory. In the area of relativistic astrophysics, the most outstanding problem which would be addressed is the physics of matter under extreme conditions such as are likely to exist in pulsars, "black-holes," and compact astronomical X-ray sources. Recent experimental and theoretical work on this problem implies discoveries of possible revolutionary importance in our understanding of basic physical principles. In the area of many-body theory, the main thrust of the joint effort would involve studies of phase transitions and critical phenomena in many-body systems. Specific problems of outstanding current interest here include: (1) scaling behavior near critical points; (2) theory of metallic hydrogen; (3) high temperature superconductivity; (4) superfluidity of He^3; and (5) metal-semimetal transitions. It is expected that these collaborative efforts would lead to more rapid solutions to important theoretical problems than otherwise possible.

The mechanism for structuring and facilitating these endeavors would be the establishment of a US-USSR Institute of Theoretical Physics. The Institute would consist of specific exchange programs for scientific workers of participating institutions on a regular basis. This would initially be accomplished by sending ten senior American physicists to the USSR for visits at the home institutions of the Soviet scientists, coupled with a reciprocal visit by the Soviets to this country. A three month period seems most appropriate for the time duration of these visits. For men of stature comparable to those listed below, this is an adequate amount of time for the generation of new theoretical insights.

Suggested participants in the program for the first year include, in the area of relativistic astrophysics:

U.S.	U.S.S.R.
K. Thorne, Cal Tech	Zeldovitch, Inst. of Appl. Math
D. Pines, Illinois	Novikov, Inst. of Appl. Math.
J. Wheeler, Princeton	Shklovsky, Sternberg Institute
C. Misner, Maryland	Schwarzmann, Sternberg Institute
M. Ruderman, Columbia	Tsytovich, Lebedev

and, in the area of many-body theory:

U.S.	U.S.S.R.
J. Bardeen, Illinois	Ginzburg, Lebedev
K. Wilson, Cornell	A. A. Migdal, Landau Institute
R. Ferrell, Maryland	Khalatnikov, Landau Institute
W. Kohn, Cal. (San Diego)	Dzaloshinskii, Landau Institute
P. Hohenberg, Bell Labs	Pitaevski, Inst. for Physical Problems

The US theorists named above have suggested the names of the USSR participants listed. This should not be interpreted as a listing of one-to-one correspondances, however. In all cases, the proposed US participants could interact fruitfully with most of the USSR scientists named in their area of expertise, and we believe that the same statement is true for the Soviets. Nor should the above listing be construed as inclusive, and for that reason, we propose that each side form informal working committees composed of the above mentioned people, and that these committees each choose one of their members to act as spokesman for the group. The working committees could then set priorities and iron out details of itineraries and timing in a coordinated fashion, as well as determine the direction of the program in future years.

Because the two suggested problem areas are ones in which the USSR and the US compete on equal fasting for world leadership, and because no specialized research facilities are involved, each side will contribute its intellectual talents equally. Neither country can thus be said to provide a unique contribution to the research. The joint venture proposed here, however, operating with the suggested personnel, virtually guarantees that important new breakthroughs will result. As such, the program will provide a very visible and noteworthy example of the benefits which can be obtained through international cooperation in basic science, as well as demonstrate that this science transcends international boundaries.

Almost all of the suggested US participants have already worked in the USSR for varying periods of time. Wheeler, Thorne, and Misner stayed in the Soviet Union for six weeks during the summer of 1971, where they met with all of the USSR astrophysicists named here. Thorne has had several extended stays in Moscow, and has just finished a definitive survey of the physics of compact X-ray sources in collaboration with I. D. Nevikov. Pines has made numerous visits to Russia,

and, since his research interests span both areas of specialization, he has interacted extensively with all of the Russian participants. He has been active for several years now as a coordinator for a bi-annual exchange of many-body theorists between the US and the USSR, with Khalatnikov as his USSR counterpart. Wilson, Bardeen, Hohenberg, and Kohn have participated in this exchange (which has been negotiated through the two national academies), and Ferrell has just returned from a sabbatical leave in the Soviet Union. Several of the USSR participants (Khalatnikov, Ginzburg, Shklovsky, Novikov) have visited the US in the past, and it appears that Tsytovich may spend the spring term at the University of Illinois, working with Pines and his group. Other USSR scientists have been invited here on a number of occasions (Zeldovitch), but have so far not actually visited.

The program should be an ongoing one, with a start by the summer of 1973.

In accordance with current practice, it is expected that the host country will pay living costs and local travel expenses for the visiting scientists, while the visitors will obtain international travel expenses from their own country. Implementation of this program would cost the US approximately $45K in FY 74. This includes travel to the USSR for ten US scientists, and local travel and per-diem ($25/day) for 10 USSR scientists for a period of three months. The cost of the program in future years would scale linearly with the number of senior personnel involved. If, as expected, students and junior coworkers also participate in future years, the cost per participant will approximately double because of the necessity of providing salary for such personnal.

Benefits will acrue equally to each country. They include the intangible ones of new and powerful insights into the nature of the physical world, together with the more tangible demonstration that both countries can work together in attacking these basic problems in a more efficient fashion than either will do alone.

If this program in Theoretical Physics is approved as a new area for collaboration, the next step would be to convene a small working group to meet with their counterparts to develop the details of such a proposal and, if approved, to proceed with implementation.

B. Experimental Physics

Collaboration is proposed in various programs in experimental physics, particularly in the areas of

1. Gravitational Radiation Physics

Research directed toward acquiring new knowledge of the gravitational force, exploring consequences of the theory of general relativity and competing theories. In particular, measurements of properties and transmission of gravitational radiation at widely separated points on earth.

2. Atomic Physics

Research in atomic collisions, atomic spectroscopy, laser developments and laser applications, would benefit from collaborative efforts.

3. Heavy-Ion Physics

Research on reaction dynamics involving interactions of heavy ions, including such phenomena as effects of high angular momentum states on reaction mechanisms and nuclear structure studies, reactions involving multi-particle transfers, would all benefit from collaborative efforts.

The groups to be involved in each field are as follows:

	U.S.	U.S.S.R.
(1)	Fairbank, Stanford Weber, Maryland	Braginskii, Moscow State University
(2)	Fried, UCLA Drummond, Texas Crawford, Stanford Inst. of Plasma Research	Golant, Ioffe Inst., Leningrad Sagdeev, Inst. of High Temp. Research, Moscow Tolok, Inst. of Phys., Kharkov
(3)	Sheline, Florida State Gove, Rochester Bromley, Yale Sugihara, Texas A&M	Flerov, Dubna Aganefyan, Dubna Volkov, Dubna

It is expected that collaborative efforts in these areas would result in significant progress in physics and be of substantial value to both countries. It is proposed, therefore, to arrange for a small United States working group on experimental physics to meet with designated counterparts and ascertain or identify specific projects for direct cooperation.

Approved For Release 2000/04/17 : CIA-RDP79-00798A000500010002-0